Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Resistance of plague bacillus to cold.

YOKOHAMA, JAPAN, *June 11, 1900.*

SIR: I have the honor to inclose herewith a literal transcript of some observations recently published by Dr. H. Noguchi, one of the Japanese physicians who went to Newchwang at the time of the epidemic of plague at that point last winter, upon the resistance of the plague bacillus to low temperatures under natural conditions, believing them to be of some value.

Respectfully,

STUART ELDRIDGE,
Acting Assistant Surgeon, U. S. M. H. S.

The SURGEON-GENERAL,
U. S. Marine-Hospital Service.

[Inclosure.]

Experiments on the resistant power of the plague bacillus against cold in dry conditions and in frozen liquid media.

[By H. Noguchi, general hospital, Newchang, China, from Sei-I-Kwai Medical Journal, Tokyo, May 31, 1900.]

Unless we know the true cause and the biological characters as well as the epidemiological relation it is impossible to win a triumphant victory against any epidemic; so the modern medicine shows the tendency for the microscopical researches, and the true causes of many diseases were discovered by many scientists.

Since the bacillus of plague was discovered many elaborate investigations have been undertaken, and nowadays we see it is a common epidemic like cholera or diphtheria, but, on the other hand, there is much as yet unexplored for further investigation, especially the biological study of this microbe against cold or freezing in dry condition or in liquid.

It is a great pleasure for me to meet with such a good opportunity to study about this problem, which is not yet experimented exhaustively by western bacteriologists, in such a cold season.

Various experiments were performed to study about the resistance of the plague bacillus artificially, but the results were unsatisfactory and limited to comparatively high temperatures, owing to the hot climate where the experiments were carried out.

Recently Dr. Abel has made experiments in India concerning this relation, but was unable to get a temperature lower than 4° C. in the ice chest.

We regret very much that we have no means to get the required apparatus to produce a low temperature artificially, so the circumstances enforce us to content with the natural temperature, which was 24° C. below zero at the lowest point at Newchang this winter.

With a freezing mixture we have tried to get a lower temperature than that of nature, but we have found it did not go below 20° C. below zero.

I have made 3 series of experiments on the following problems:

1. After how many hours exposure to cold under dry conditions can the plague bacillus be killed?
2. After how many hours exposure to the most suitable temperature under dry conditions can the plague bacillus be killed?
3. After how many hours exposure to cold in the frozen liquid media can the plague bacillus be killed?

For experiments 1 and 2 I have used 2 kinds of pure agar culture forty-eight hours old; they were obtained from 2 different sources, or 1 specimen from my case on December 4. The patient was a Mohammedan church keeper named Liu-foo-chi, who died at the plague hospital on the 5th, eight hours after I had taken the blood to make culture, as there was no bubo but bloody sputum. I believe it was the first time to obtain the culture here by us, though Dr. Yassenski was the earliest to win a microscopical diagnosis, which was done on December 3 already, and another from Dr. Murata's case on December 7, 1899.

Taking a platinum needle, I have smeared the cover glasses—2 sets respectively—with each culture, and each set was put in 2 dishes bearing marks A (mine) and B (Dr. Murata's).

After preparing thus I have laid each dish of both cultures in a shady place outside the hospital with the thermometers. (Experiment 1.)

Another remaining set was placed in incubator keeping 30° C. (Experiment 2.)

For Experiment 3, two tubes of pure bouillon cultures, forty-eight hours old, were placed by the first dishes.

The results are shown in the following tables:

			Experiment 1.				Experiment 2.				Experiment 3.				
Minimum temperature during experiment.	Date and time.	How long exposed.	Controls.				Controls.				How long exposed.	Controls.			
			A. A[1].	B[1].	B. A.	B.	A. A[1].	B[1].	A.	B.		A[1].	B[1].	A.	B.
Degrees.		*Hours.*									*Days.*				
15.5 C	Jan. 9, 4 p.m.	....	......	......	......	......	......	......	......	......	....	......	......	......	......
	8 p.m.	4	......	......	(*a*)	(*a*)	......	......	(*a*)	(*a*)	....	......	......	......	......
	12 m.	8	......	......	(*a*)	(*a*)	......	......	(*a*)	(*a*)	....	......	......	......	......
18.5 C	Jan. 10, 6 a.m.	14	......	......	(*a*)	(*a*)	......	......	(*a*)	(*a*)	....	......	......	......	......
	10 a.m.	18	......	......	(*a*)	(*a*)	......	......	(*a*)	(*k*)	....	......	......	......	......
	4 p.m.	24	......	......	(*a*)	(*a*)	......	......	(*k*)	(*k*)	....	......	......	......	......
	10 p.m.	30	......	......	(*a*)	(*a*)	......	......	(*k*)	(*k*)	....	......	......	......	......
21.5 C	Jan. 11, 4 p.m.	48	......	......	(*a*)	(*a*)	......	......	(*k*)	(*k*)	1	......	......	(*a*)	(*a*)
		Days.													
15.5 C	Jan. 12, 4 p.m.	3	......	......	(*a*)	(*a*)	......	......	......	(*k*)	2	......	......	(*a*)	(*a*)
23 C	Jan. 13, 4 p.m.	4	......	......	(*a*)	(*a*)	......	......	......	......	3	......	......	(*a*)	(*a*)
23.5 C	Jan. 14, 4 p.m.	5	......	......	(*a*)	(*a*)	......	......	......	......	4	......	......	(*a*)	(*a*)
21.5 C	Jan. 15, 4 p.m.	6	......	......	(*a*)	(*a*)	......	......	......	......	5	......	......	(*a*)	(*a*)
23 C	Jan. 16, 4 p.m.	7	......	......	(*a*)	(*a*)	......	......	......	......	6	......	......	(*a*)	(*a*)
23.5 C	Jan. 17, 4 p.m.	8	......	......	(*a*)	(*a*)	......	......	......	......	7	......	......	(*a*)	(*a*)
18 C	Jan. 18, 4 p.m.	9	......	......	(*a*)	(*a*)	......	......	......	......	8	......	......	(*a*)	(*a*)
12 C	Jan. 19, 4 p.m.	10	......	......	(*a*)	(*a*)	......	......	......	......	9	......	......	(*a*)	(*a*)
19 C	Jan. 20, 4 p.m.	11	......	......	(*a*)	(*a*)	......	......	......	......	10	......	......	(*a*)	(*a*)
Do...	Jan. 21, 4 p.m.	12	......	......	(*a*)	(*a*)	......	......	......	......	11	......	......	(*a*)	(*a*)
20.5 C	Jan. 23, 4 p.m.	14	......	......	(*a*)	(*a*)	......	......	......	......	13	......	......	(*a*)	(*a*)
23.5 C	Jan. 24, 4 p.m.	15	....	......	(*a*)	(*a*)	......	......	......	......	14	......	......	(*a*)	(*a*)
15.5 C	Jan. 30, 4 p.m.	21	......	......	(*a*)	(*a*)	......	......	......	......	20	......	......	(*a*)	(*a*)
14.5 C	Jan. 31, 4 p.m.	....	......	......	......	......	......	......	......	......	21	......	......	(*a*)	(*a*)

[1] Grew well.

NOTE.—The lowest temperature was 24° C., on January 26; *a* alive; *k* killed; astronomical thermometers were used.

We have proved that the plague bacilli are not devitalized by the temperature of 24° C. below zero even after three weeks long.

The plague bacilli under the dry condition combined with severe cold could maintain their vitality just as shown in Experiment 1. It must be explained by the special relation of the freezing process which may render the bacilli as not dehumanized (q. dehydrated?) enough to derange their proper organization by virtue of quite slow evaporation of the frozen water within the protoplasm, while experiment 2 teaches us that the most suitable temperature has favored evaporation and the bacilli rapidly became as a mere dried proteid or nuclein.

Experiment 3 is of the same result as Experiment 1.

The peculiarity possessed by the plague bacillus is this wide limit of temperature for its multiplication, not like other pathogenic germs. It can grow uniformly, slowly but steadily, from 20° C. to 37° C., which we see rarely in other bacteria.

The plague bacilli if laid near the freezing point stop their growth and remain for a long time inert waiting for further chance of good hosts.

From the several reports published by the German plague commission to Bombay, I have learned that the pneumonic forms are comparatively few, while the official report of the sanitary board of Germany showed that the majority of cases in Odessa were of pneumonic form.

Of course, the nature of an epidemic is influenced by the climate and the resistance of the plague bacillus on one side, and it also depends greatly on the customs of the nations.

In India, where the hot air and dry soil are very unfavorable to the floating bacteria to retain their lives even for a few minutes, the pneumonic forms are produced by the direct contagion with fingers or pipes, etc., of the patient, or particles of sputum.

In contrast to India, Chinese houses are furnished with favorable conditions for the plague bacillus, bad ventilation, bad leading of sunshine, and heaping of human excrements, etc., especially the earthen floor must be regarded as a most dangerous source of infection.

Chinese people do not use spittoons in their rooms and spit anywhere; indeed, I have seen that the pneumonic-form cases were spitting their bloody sputum on the beds, windows, walls, or floor at the agonial stages, and the family relatives trampled the sputum into powder within a few minutes.

What will be the result? We must pity their ignorance.

This may be the cause of the larger number of cases of pneumonic form in Newchang.

It is described that animals were victims to the plague during epidemics in the middle ages, especially mouse pestilence.

According to Professor Pfeiffer it has been experimented about the susceptibility for plague already.

Birds and swine are quite immune to plague. Horses, cows, goats, sheep, dogs, and cats have more or less susceptibility, but they manifest only a slight lesion which is not fatal, while monkeys (ape) and other allied species higher susceptibility, and mice and rats are highest above all.

For the preventing purpose of propagation of plague through mice or rats, Japanese Government offered to buy the dead or living mice, where the people use the medicine—a mixture of arsenic—or traps and cats.

After the plague invaded Japan, the Japanese sanitary association has offered a prize for the best method of hunting rats.

About a month ago there were a few cases of plague in Honolulu, Hawaii, and the Chinatown was burned up and deserted for two years by American authority.

When a mouse suffers from plague it loses its timid character, and appears to the room often, and dies in a corner or in shade of box, etc.

Mouse has a habit of eating the corpse of its friends, and in town it dies of the same disease, so it aids for the latent propagation of plague.

It is needless to say that sanitary measures are only compatible with legislation and police institution. Without the latter it is very difficult, or rather impossible, to protect the nation's health. That half of our efforts here may be fruitless for the prevention of plague is the inevitable result from the circumstances surrounding us, but there is no doubt that the sanitary board has cultivated a great deal of the sanitary thoughts of this ignorant, miserable people, and it will certainly be fruitful for the future development of the sanitation of the city, or rather of this country.

Well, supposing that there is no satisfactory measure to save this town from plague at present, it is most important to find out any other means to protect the health of the foreigners staying here.

In my opinion it is safer to isolate ourselves from Chinese than to isolate them, putting every house under strict inspection, especially for their employees and mice or cattle, starting a complete public market for provisions for the foreigners' requirements apart from the town and suspicious grounds.

Carrying out the above plan as a temporary measure we shall find out any other means to let the Chinese authority arrange the town in order to stamp out the pestilence as in civilized countries, giving the half of the foreigners in any way for the permanent success.

In performing these experiments I am indebted very much to Dr. Daly, Dr. Murata, and assistants in the general hospital, and I express my deep thanks to these gentlemen heartily.

NETHERLANDS.

Report from Rotterdam.

ROTTERDAM, NETHERLANDS, *June 26, 1900.*

SIR: I have the honor to make the following report of the transactions of the Service at this port for the week ended June 23, 1900: Four vessels were inspected and received bills of health. The steamship *Potsdam*, of the Holland-American Line, sailed for New York on the 21st instant, carrying 127 cabin and 785 steerage passengers. Three hundred and forty-two pieces of baggage were inspected and passed and 52 pieces were disinfected. The health of this port continues good.

Respectfully, A. R. THOMAS,
Passed Assistant Surgeon, U. S. M. H. S.

The SURGEON-GENERAL,
U. S. Marine-Hospital Service.